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THE TRUTH PROBLEM

I

THERE appear to be at least four fundamentally different senses in which the term "truth"[1] is employed. In most discussions of the topic either these four senses are blended, or some one of them is asserted to the exclusion of the others. I believe that the general problem of truth is to be solved by distinguishing these four senses and then accepting them all, each in its place. I shall call these senses logical, ontological, existential, and psychological. Truth in the first or logical sense is that 'is'-character which is represented by the verb without the sign of negation. It corresponds to the "affirmative quality" of judgments in Kant's half-psychological, half-logical account of the categories. I shall refer to it as "positivity" or logical sign. Truth in the second or ontological sense is referred to in symbolic logic by the "assertion" sign, and in ordinary language by the expression, "it is a fact that." It is the same as the category of 'being,' that which is signified by the categorical form of the verb. I shall also employ the term "factuality." Truth in the third or existential sense turns on the peculiar relation between a universal and its instance, or between a variable and its value. That which is true in this sense is said to "hold" of something. I shall also employ the term "validity," intending to imply that to be valid is always to be valid *of*. The fourth or psychological sense of truth applies only when there is an act of mind such as thought; and is then an adverbial qualification of this act. One is in this sense said to think "truly." I shall also refer to this sort of truth by the term "correctness."

Before undertaking a closer examination of these four sorts of truth, there is one principle of method that should be made explicit. It is as necessary as it is proper to assume that we can use our minds without introducing them into the discussion. Suppose, for example, that we are following the proof of the geometrical theorem that the square on the hypothenuse of a right-angle triangle is equal to the sum of the squares on the other two sides. In following such a proof we employ verbal images, we doubt, conjecture, infer, and conclude; but these states and acts of mind are not parts of the geometrical field of inquiry and do not themselves become a topic for discussion until the attention is shifted. They are no more relative to the proof than is the fact that I am using chalk or wearing glasses. It would be improper to ignore them only provided their introduction would make the geometrical equality in question more evident. Similarly when I see that this green is different from this blue, I may ignore the fact that I am seeing these colors because it contributes nothing to the evidence for their difference. It is an afterthought, a new topic, and not a constituent of the original topic. This is equally the case when the mind itself is under discussion. The fact that I am using my mind when I am studying it may be ignored, until that additional and more complicated fact of self-consciousness is expressly brought forward. The application to the matter in hand is this. If it is possible to discover truth-properties of a sort that do not contain my mind as a constituent, or depend on it as a part of their evidence, then it is proper and necessary to ignore the fact that my mind is discovering them. This new fact must be reserved as a new topic, and await its turn. *What* we are judging or thinking in any given case is one thing, which may or may not involve mind; but the fact that we are *in that case* judging or thinking is at any rate irrelevant. To introduce it is to raise a distinctly new question which must not be confused with the old. No discussion can be coherent without the adoption of this principle. It is a commonplace of science and of vulgar opinion. But philosophers, I think, can afford to be more mindful of it. Its present bearing will appear more clearly as we proceed.

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[1] So far as it is possible to do so consistently I shall employ the double quotation marks when a word is quoted; the single quotation marks when the word's meaning is intended.

1

Let us first consider the logical sense of the term "truth." This sense is inherent in the principle of contradiction, or in what Mr. Russell calls "the contradictory function." I am unable to see that in this fundamental sense the distinction between truth and falsity is other than that between positivity and negativity. Mr. Russell, at any rate, employs "not-*p*," "the negation of *p*," "the contradictory of *p*," and "*p* is false" as equivalent expressions. The symbol "$\sim p$" may be read in any one of these ways, according as linguistic convenience may dictate. The distinction is most familiar in the terms "is" and "is not," or in the fact that every language contains an

[2] *Cf.* "Principia Mathematica," Vol. I., p. 6.

adverbial negative. For everything of the sort that is referred to by the grammatical sentence, for every relational complex, there is a hypothetical negative. Thus *the* negative of the fact that France and Germany are at war is 'France and Germany are not at war'; and this fact has a determinate negative because to have such is characteristic of this type of being. In other words, it is always significant to qualify a verb by the introduction of the term "not." Let us call this type of being a propositional complex, since this expression has the advantage of ignoring the differences between propositions, propositional functions, relationships, and facts, while calling attention to their formal similarity. We may then say that every propositional complex is reversible, contradictable, or capable of being negatived, in the same sense that it must contain an act or relation, and at least one term. This is an abstract property of the propositional complex, known by inspection.

It is well, perhaps, to note that positivity and negativity are not simple opposites, or of coordinate rank. This is suggested by the fact that there is no positive adverbial particle or logical symbol. The reason, I think, is this. The original form of the propositional complex is positive. The negative form is an alteration of the positive form. p and p-positive are the same thing; whereas p-negative is something different. To say that 'S is truly P,' or 'indeed P' is mere tautology or rhetorical emphasis; whereas to say that 'S is not P' is to say something different from 'S is P.' But this alteration or reversal may be repeated indefinitely, and always with effect. 'Not,' though it may be ungrammatical, is never tautologous.

In order to express the law of contradiction it appears to be necessary to attach a meaning to "not-p is true," as when we say that 'p is false' implies 'not-p is true.' It is, therefore, necessary to admit that while a multiplication of positivity is redundant, a positive qualification of a negative is significant. If we were to say that added positivity never made a difference, then we should in the above case have 'not-p implies not-p,' simply. But the situation may be met by distinguishing between 'not (p)' and '(not-p),' where what falls outside the bracket signifies the logical sign of the whole. In that case '(not-p)' would be positive since there is no sign-symbol outside of it; its absence being taken to signify positivity. The above law of contradiction can then be expressed: 'not (p)' implies '(not-p).'

These successive reversals that are expressed by a multiplication of negatives are not new propositions about old propositions. To find that 'p is false' is not to find that 'the proposition p is a false proposition'; but it is to state a new proposition derived by the alteration of the old. Grammatically speaking it is an adverbial change, with other parts of the sentence remaining the same; and it reflects the possibility of generating from any original propositional complex a series of propositional complexes which differ from the last only in what we may call "logical sign," that is, in that each is the contradictory of its predecessor.

This is all independent of the mental acts of affirmation and denial, or of positive and negative acts of mind generally speaking. It is independent of the act of judgment in so far as this is conceived, for example, by Windelband, as "*Beurtheilung*"; that is, as an attitude of 'for' or 'against,' of 'yes' or 'no,' of acceptance or rejection. According to Rickert, "der eigentliche logische Kern des Urteils, das Bejahen und Verneinen, ein Billigen oder Missbilligen, ein Stellungnehmen zu einem Werte ist."[3] But positivity and negativity are more fundamental than this duality of attitude in judgment. For, in the first place, it is possible to inspect the sign of propositional complexes with entire impassivity. Seeing the difference between *p* and not-*p* does not require that I shall nod my head in the one case and shake it in the other; nor does it require that I shall be cognizant of the difference between accepting and rejecting. In short, accepting and rejecting are not constituents of positivity and negativity in general, nor do they throw any light on the nature of this distinction. On the other hand, however, acceptance and rejection themselves can, I think, be understood only in terms of positivity and negativity in the more fundamental sense. Rejection, for example, is the kind of act which tends to an end-result which is negative. Thus to reject the notion of spontaneous generation is to strike an attitude such that a state of things in which the derivation of life from inorganic matter is not possible, would satisfy it, or agree with it. So, generally speaking, there is no other way to define positive attitudes of mind as a class, including such attitudes as accepting, liking, affirming, desiring, etc., except by saying that they tend to 'is,' whereas their opposites, such as rejecting, disliking, denying, aversion, etc., tend to 'is not.' It is evident that this has an important bearing on the theory of value. Without such a primitive notion as I have proposed it is impossible to distinguish between such values, for example, as aversion to life, and love of death. But using the analysis which I have proposed, we can say that the aversion is a propensity which tends to the not-being of life; whereas the love of death is a propensity which tends to the positive quality of some state of not-living.

It is no less important to see that contradiction in the logical sense is independent of physical or mental antagonism. Thus, although *p* and not-*p* are contradictories, so that *p* implies not (not-*p*), it is by no means the case that the assertion of *p* is mentally incompatible with the assertion of not-*p*, or mentally causes the denial of not-*p*. If this were the case, then it would never be possible that one should contradict one's self. It would never be possible to correct assertions and denials by appealing to the principle of contradiction.

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[3] *Cf.* Windelband's "Präludien," third edition, pages 52–53; Rickert's "Gegenstand der Erkenntnis," page 108.

The situation appears to be this. The assertion that 'the earth moves' is an attitude such that this positive fact would satisfy it. It is a tendency in the direction of this fact. The denial of the motion of the earth tends similarly to the negative fact, 'the earth does not move.' These two facts are instances of *p* and not-*p*. The assertion and the denial can exist together, but certain contingencies which define them are contradictories. What we require for this situation is a pair of processes of which certain later phases are instances of contradictories, whereas certain earlier phases are not. Consider, for example, the case of inhibition. The actual equilibrium in which nuero-muscular forces balance one another has nothing to do with contradiction. But we may say of two neuro-muscular processes that a phase to which one tends, or which it would reach if it were to complete itself, is related to a prospective phase of the other, as *p* and not-*p*. Similarly a collision taken as a mass of debris is not a contradiction. But we can say of a train moving east and a train moving west on the same track, that there is a hypothetical position of the first train, such as its arrival at Buffalo, which is related to a hypothetical position to the second train, such as its arrival at Detroit, as are *p* and not-*p*. These positions do not both occur, and their relation is not a relation between two facts. But the two trains exist and their courses are such as to be contradictorily determined or qualified. The contradiction itself is the formal relation of *p* to not-*p*, and enters into the situation only in so far as a hypothetical instance of it is contained in the definition of the schedules of the two trains. In other words inconsistency of mind, neuro-muscular inhibition and physical conflict are not the originals of contradiction, but have themselves to be explained in terms of contradiction in the more fundamental logical sense.

This logical sense of truth and falsity is, then, an inalienable characteristic of a certain type of being. There is no such thing, in other words, as a propositional complex without sign. Formal logic devotes itself to the study of this and kindred properties, such as disjunction, conjunction, the variable, implication, etc. But even logical knowledge embraces more than the bare apprehension of these properties. It discovers certain specific propositions about the proportional complex as such. These latter are the theorems or laws of logic. But these have to do with truth in the ontological or categorical sense, to which we must now turn.

2

Let us first illustrate our second sense of truth from the formal realm of logic. Thus we may simply call attention to the contradictory function, that is, to the peculiar difference between *p* and not-*p;* or to a categorical fact of contradiction, such as '*p* implies not (not-*p*).' This distinction is illustrated, for example, by the difference between '*p* implies *q*' and '(*p* or *q*) implies *p*.' The latter appears in formal logic with the so-called "assertion" sign prefixed to it; the former is said to be merely "considered." I believe that it is possible to rid this distinction altogether of the psychological associations that cling to the terms "assert" and "consider." When one considers *p,* one does not have a proposition before the mind, but propositionality. Similarly, for '*p* implies *q*,' one does not have before the mind the propositional fact that *p* implies *q,* but the general character of implication with the duality of terms which that involves. It is not a propositional complex because it lacks terms. That is to say, *p* does not stand for anything except the term-character, or term-reference, which is a part of the implicative as of other relations.[4] When, on the other hand, one asserts that (*p* or *q*) implies *p,* one has terms as well as the implicative relation, '*p* or *q*' being the nature of the positive disjunctive relation, and *q* having the specific character of being the same on both sides of the relation. There is no relational complex unless there is something which is in the relation in question. If there is, then the assertion sign may be attached to the symbolic propositional expression. In other words, it is a question as to what is before the mind, and not of the attitude of mind itself.

It may be argued that this does not meet the difficulty that the same proposition may be considered and asserted, and that this possibility is essential to logic. Thus, the proposition '*p* implies *p*' which is asserted in logic, may appear as a constituent of the proposition '(*p* implies *p*) implies (*p* implies *p*),' where it is not asserted. It is to be noted, however, that no such proposition as this appears among the propositions of logic, because it merely exemplifies the law '*p* implies *p*.' It is equivalent to asserting that there is a proposition, namely, '*p* implies *p*,' of which the law that a proposition implies itself holds. Logic does not discover instances of laws, but only laws which are whether there is anything that obeys them or not. To say that in '(p implies p) implies (p implies p),' 'p implies p' is not asserted, means simply that it is not found. It is not there, so far as logical discovery is concerned. It is there only in so far as it is discovered in some extra-logical manner that there is a proposition which affords a case of the logical law.

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[4] *p* does not mean 'other than *q*,' nor do *p* and *q* both mean mere propositionality. The first interpretation would give an erroneous proposition (in the sense considered below). The second interpretation would mean that every proposition implies itself, and should be expressed, '*p* implies *p*.'

This non-asserted factor in propositions is more familiarly known in cases of physical or mental particulars, and its non-assertion is more commonly expressed in the hypothetical form of speech. Thus, we say, "if the earth is a sphere, then all points on its surface are equidistant from its center." This every one would grant to be a fact, even though he denied that the earth *is* a sphere. If the total fact is independent of the earth's being a sphere, then the earth's being a sphere can not, *as a constituent of it,* be itself a fact. And if we are careful we shall say, I think, that what we really see is not anything about the earth, but what is implied in sphericity. Instead of "the earth" we might better say "the earth, for example," or "anything." So the non-asserted proposition 'the earth is spherical' simply isn't there, except in a verbal or symbolical sense yet to be accounted for. Even so something else can be substituted for it without altering the fact which is known.

Similarly, it is a fact that you are reading this. 'Your reading this' is a complex of the propositional sort, and it possesses the ontological or categorical status. This is different from its positivity which is opposed to the negative character of 'your *not* reading this.' Its factuality is opposed to the character attaching to 'you' as a constituent of the complex, or to 'your reading this' as a constituent of the complex 'your reading this implies your not ignoring this.' 'You' are not a fact because 'you' are not a propositional complex. In '(your reading this) implies (your not ignoring this),' 'your reading this' is not a fact because in the total fact, this constituent has no terms. The total fact, as one sees that it is so, is independent of 'you' and of 'this.' It is equivalent to 'p implies not (not-p).' The total fact does have terms, namely, 'positive proposition' and 'double negative of the same proposition.' The fact 'you are reading this,' although a fact, is not a logical fact, because it contains the terms 'you' and 'this,' which are not among those general structural properties of propositional complexes which distinguish the terms of logic. Thus a fact is a propositional complex with terms. It is found as such, and not created by the act of knowing. A non-fact is anything that is not a propositional complex; or a propositional complex without terms. It commonly appears as a constituent of a fact. A logical fact is a fact in which the terms are propositional complexes without terms. It is a fact about the propositional complex as such, in which the terms are variables; or a fact in which what is given is the nature of one or more universals and their relations.

To sum up, then, we may say that in logic certain abstract data, such as the characteristics of the propositional complex, are brought to light. Among these properties are positivity and negativity. Logic also brings to light certain propositional complexes in which these properties are the terms. These propositional complexes may not improperly be called "logical facts." They are true both in the sense of having the character of positivity, and in the further sense of having the categorical or ontological character. They possess truth of both sorts quite independently of any knowing mind. It is impossible to characterize a knowing mind or any other similarly complex existent without appeal to these varieties of truth as more primitive. It is true that these facts are arranged in logic in an order of "inference," or "proof." This, I believe, means two things. In the first place it means simply that some of the facts are implied jointly by others. But these trains of reasoning are not themselves among the purely logical facts or theorems. They are introduced because, in the second place, logical facts, if they are to be apprehended at all, have to be apprehended in a certain order. There is a necessary order of evidence or exposition, for which the only objective basis is this order of joint implication. A logical treatise aims to get logical facts apprehended. It will therefore place first what it is necessary to have seen in order to see what is placed after. In saying that logical facts are "about" propositional complexes without terms, or propositional functions, we have already employed the third sense of truth, to which we now turn.

3

We have now to do with the situation in which there is a propositional complex with variables on the one hand, and something that is a value of a variable, on the other hand. It is what we have when a law holds or is valid of something, or an event fits a description, or a thing enters into a relation. It is fortunately not necessary to adopt any consistent nomenclature, or reach any precise account of the distinction. It is perhaps nothing more than the distinction between a universal and one of its instances. All that we do need to assume is that this is an objective distinction, holding of our world regardless of whether that world be mind or matter. There is, so far as I can see, no possibility of doing away with universals. The effort to do so has never, as Mr. Russell has shown, accomplished more than the reduction of other universals to similarity, and such a reduction disposes of no difficulties.

Let us consider an example: 'x to the right of y' prescribes what shall be the case with any value of x or y. If there is a thing (such as this hand with which I write, w), which is a value of x, and another thing (such as this hand with which I hold the paper, h), which is a value of y, then 'to the right of h' describes the one and 'w to the right of it' describes the other. There are two things which obey the law 'x to the right of y.'

There are two aspects in which "truth" appears in this situation. First, I say of the law that it is "true *of*" my right hand; or that it is true of existence generally in the sense that there is a value for the variable. Second, I say of the value that it "satisfies" the law, or is "true *to*" it. The former is the sense in which the laws of Euclidean space are said to be true of nature. The second is the sense in which Lincoln is said to be a true man, or the orbit of the earth a true ellipse. They are true to some general function or law. It is in this latter sense that the term "true" is sometimes used interchangeably with the term "real." A "real" difference is simply an instance which satisfies the relation of difference. This sort of truth may be termed "existential," if we use this term to signify 'instance' or 'case of,' as when we ask "breathes there a man with soul so dead," etc.?

It does not appear, however, that there is any corresponding sense of falsity. The law which does not hold of an event of nature is not 'false of' that event, because it is not in any discoverable sense 'of' it at all. Triangularity is not false of Shelley's "Ode to a Skylark"; it is simply irrelevant. Similarly, the event of nature that does not satisfy an equation, is not 'false to' that equation, it is not 'to' it at all. Even if there be a law which nothing obeys, it is not false of existence. It simply does not relate to existence. One can, if one wishes, say that a law is false of everything that it doesn't apply to; and that a particular is false to every law that it doesn't conform to. But even so, this does not provide for the cases in which a law is said to break down in a particular application, or an event to violate a specific law. We may say of an event which obeys a law which is the contradictory of M, that it disobeys M. But why in that case is it held to violate M, rather than any of the other laws with which its law is equally contradictory? Here it seems necessary to introduce a mind which relates a law to an event, by thinking the one of the other. In this way, through the intervention of mind, a law may be misapplied to an event, or an event defeat an expectation which has been created of it.

We must be careful not to assume that all of the general functions that may apply to nature are themselves logical facts. For the majority of them are not. The laws of physics do not, like the theorems of logic and mathematics, stand in their own right. There would, for example, be no law of gravitation unless nature obeyed it, whereas the laws of analytical geometry hold regardless of nature. The law that the velocity of a body falling to the earth increases proportionally to the time, is logically and mathematically no better than the law that it increases proportionally to the distance. Neither is true inherently, in the categorical sense of the term truth. The first law is true *only* in the sense that it is true of actual bodies in nature. The same is the case with the Ptolemaic and Copernican astronomies. The Copernican astronomy is true existentially or materially, but not formally; the Ptolemaic astronomy not at all.

But what, then, is the Ptolemaic astronomy, or Aristotle's law that heavy bodies fall faster than light? They are hypotheses, doubtless. But what, then, is an hypothesis? It contains two characteristics. In the first place, it is important to note that it has logical structure. It could not be framed at all unless there were certain fundamental truths of the sort already considered. A "genuine" hypothesis is one that is logical or mathematical. It is not a mere combination of symbols. It must exemplify such properties as contradiction, implication, disjunction, etc., and such abstract propositional facts as are contained among the theorems of logic and mathematics. In the second place, it is important to note that it is *framed;* which means that over and above these more fundamental facts which the mind finds, there is a special application or assignment of them which the mind creates and may or may not find. To take a relatively simple case, let us consider the hypothesis that the population of New York is greater than that of London. This is a genuine hypothesis in the sense that there is such a relation as 'greater than'; that is, '*x* is greater than *y*' refers to a mathematical property. The hypothesis, which contains this relation or function is, as we say, 'intelligible,' in that it means something that one thing should be greater than another; one is saying something when one uses these words. There is also New York, and there is London. But 'New York as a value of *x*,' and 'London as a value of *y*,' is due to the intervention of mind, at least so far as the hypothesis is concerned. The hypothetical act is this assignment of a given particular to a variable of a given function. The propositional complex 'New York is greater than London' is true of the hypothecating mind, as something which it does; whether or not 'greater than London' is true of New York, that is, independently of mind.

Let us suppose this last alternative to be the case. We then have a law '*x* is greater than London' which is true of something, namely, New York, in the third or existential sense of the term truth. But this law is itself a fact, if we construe it to mean that the principle of having something greater than itself is true of London. Thus a fact may be true of a fact. But the law, 'x is greater than y,' while true of London, is not itself a fact. This, then, is true only in the third or existential sense. Now if it so happened that London was greater than New York, then the complex "New York is greater than London" would be annihilated altogether, unless some mind entertained it as a hypothesis. In that case it would be true only of the mind entertaining it. It would then be a *mere* hypothesis. But according to our supposition that New York is greater than London, 'x is greater than London' has a triple status; it is a fact, it is true of New York, and it is a hypothesis. When such is the case we have, I believe, the fourth type of truth, to which we shall presently proceed.

Before doing so, however, it may be worth while to indicate the sense in which nature is irrational, or non-logical. A fact which is true existentially may be a logical fact. Thus '(x is greater than y) implies (y is less than x),' while it is true of New York and London, is also itself a fact. There is such a propositional complex, quite apart from its application to these historical cities. It is doubly true; it is true existentially, as the law of something, and it is also a mathematical fact holding of the property of magnitude. A realm of existence which exemplified only logical or mathematical facts, so that all of its laws were categorically true independently of everything but the bare structural or formal properties of the propositional complex might be termed a purely rational world. It would simply illustrate pure logic and pure mathematics. As a matter of fact, however, the physical or natural laws, although they contain such formal truths, are not as they stand formally true. For, as we have seen, such a law as Galileo's law of acceleration, to the effect that the velocity of a falling body is equal to the time of its fall multiplied by a constant, is true *only* in the sense that actual falling bodies obey it.

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(*To be continued*)

THE LOGICAL SIGNIFICANCE OF THE PARADOXES OF ZENO

THAT the paradoxes of Zeno still maintain their interest for the student of logic is a significant fact which has been recently emphasized by the discussion of these problems in Mr. Bertrand Russell's volume, "Our Knowledge of the External World." In this work the conviction is expressed that these ancient difficulties